REMARKS

Election and Amendment to the Claims

The Examiner has required restriction between the following inventions:

Group	Claims:
I	20-32
II	33-42
III	43-52

Applicant elects with traverse Group I which is embodied in Claims 20-32 and claims 53-58. Applicant respectfully notes that the base structure of the embodiment of the invention is shown in claim 20 and claim 54. The base structure is modified with a particular dopant to either amplify or modulate an optical signal as shown in claims 33-53. The inclusion of a dopant in the second layer should not seriously increase the search burden. Applicant requests withdrawal of the restriction requirement.

Further, Applicant respectfully requests consideration of Fig. 7. Both in previously submitted and in the replacement sheet, where the air gap between the waveguide cores has a refractive index of 1.0 and can serve a cladding, thus, the effective NIC value with respect to silicon is deduced as,

$$\Delta n = \left(\frac{3.4 - 1.0}{1.0} \right) \times 100 = 240\% .$$

Further, as was asked to explain during interview, the Natural Index Contrast (NIC) method and its novelty are described in details in the

specification; see for example Para 25 through Para 36.

Further, as was asked to explain during interview: All waveguide has core refractive index higher than cladding index, how is NIC method different? As explained in the specification (see for example, Para 31), the (NIC) method differs from other methods on how index contrast is created and utilized in waveguide fabrication and its functionalities. In the NIC method, engineered nanomaterials (e.g., dendrimer) with predefined molecular composition are used to make the waveguide core and cladding, such that, the built-in or "natural" index automatically ensures waveguiding. Moreover, NIC method also ensures that a waveguide can simultaneously amplify and modulate an optical signal. This is uncommon for the current art and we claim novelty for the NIC method for this ability.

Further, as was asked to explain during interview: What is n_1 and n_2 in the equation of claim 20? What's their connection to the waveguide? As explained in Para 31, n_1 is the refractive index of cladding layer and n_2 is the refractive index of the core layer. Examples of numerical values are also given in the specification (see Para 56). However, here we focus attention to the NIC value (Δn) as opposed to individual values of n_1 and n_2, because, it is the difference of the indices that is important for waveguiding; not their individual values. For another example, the dendrimer nanomaterial's refractive index can be tailored by molecular engineering over a wider range such as from 1.4 to ~2.5 (see Para 54 of the specification). In such situation two different dendrimer compositions can be chosen to form a waveguide for several different applications:

waveguide, bent, split, amplifier, modulator, etc. The NIC method enables to form a waveguide to satisfy required conditions for all of these different functionalities. Thus it is novel to specify the NIC value for such conditions than individual values of n_1 and n_2.

The Applicant respectfully requests that the Examiner enter the aforementioned amendments for consideration. With this amendment, claims 20 - 58 are new.

No new mater has been added.

The claims currently presented are proper and definite.

Accordingly, allowance of the elected Group is in order and is respectfully requested. However, should the Examiner deem further clarification of the record is in order; I invite a telephone call to the Applicant to expedite further processing of the application to allowance.

Correspondence and Fees

A credit card payment for $225.00 is enclosed for 1 additional independent claim and 6 total claims. No additional fees are believed to be necessitated by the instant response.

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The Applicant can be reached by telephone at 717-220-1003. Any fax communication can be sent to 717-566-1177.

Respectfully submitted,

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